

UNIVERSAL POWER SUPPLY SYSTEM

BACKGROUND OF THE INVENTION

5 Field of Invention

The present invention relates to a power supply system. More particularly, the present invention relates to a universal power supply system, which can intelligently supply a specific voltage for various types of device circuits.

10 Description of Related Art

As semiconductor fabrication technology develops, dimensions of electronic devices have been greatly reduced. This allows many electronic devices to be small enough to be portable, such as the portable personal computer, cellular phone, camcorder, digital cameras, portable DVD, portable CD, cassette, MP3 player, and personal
15 digital assistants (PDA). When these portable electronic devices are operated in an area having no public power source, they need batteries to supply the electric power. However, when electric power is supplied by a battery, it has limitations due its limited storage capacity. This can be very inconvenient for the user.

In order to continuously use the electronic devices, typically a user needs to pre-
20 purchase specific batteries for backup power. Since the specifications of batteries for different electronic products are not always the same, it is necessary to have many different types of batteries. Also the user may need to buy many specific chargers with respect to the specific electronic products. The chargers can only be operated using the public standard power source. This can also be very inconvenient.

Therefore, even though a portable product has its advantages, its advantages can be limited by lack of usable operating time. This limitation is more obvious for products with higher power consumption, such as PC, PDA, and Cellular phones. When using batteries these products can have short usage time, and their batteries typically cannot be widely used. This factor causes a degradation of performance for the portable products. The difficulty of low battery usage times is an issue that manufacturers must work to solve..

SUMMARY OF THE INVENTION

10 The invention provides a universal power supply system, which can supply power to various types of products through a universal power supply. The use of a backup battery can effectively simplified.

As embodied and broadly described herein, the invention provides a universal power supply system, which comprises a device circuit, a universal power supply, and a standard interface unit coupled between the device circuit and the universal power supply, whereby a required power is supplied to the electronic product. The device circuit includes a device ID code unit, and a power input interface by which the required power can be inputted to the device circuit. The universal power supply includes a voltage supply unit, a device ID detecting unit that can detect the device ID code through a standard interface, and a voltage control unit to control the voltage supply unit for providing the required power type through the standard interface.

In the foregoing, the voltage supply unit of the universal power supply includes a rechargeable battery, and a charger to charge the rechargeable battery.

In the foregoing, the voltage supply unit of the universal power supply includes a power transforming apparatus, which allows an external public power source to be transformed into the battery-type power.

5 In the foregoing, the standard interface unit includes a standard interface having several plug holes, and a multi-wire cable. The plug holes and the wires of the cable are coupled, respectively. Function of each of the plug holes is defined, according to the type of the device circuit. The multi-wire cable connects between the device circuit and the universal power supply.

10 The multi-wire cable includes a power line, a grounded line, an ID signal line, and a safety signal line, where the power line transmits the intended voltage, the ID signal line is used to transmit the device ID code, and the safety signal line is used to transmit a safety signal.

15 The invention also provides a method for providing voltage for a device circuit. The method includes pre-setting the device circuit with a device ID code, and then detecting the device's ID code to recognize the type of device circuit. According to the device ID code, a requested power type with respect to the device circuit is sent thereto.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed.

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BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The

drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings,

FIG. 1 is a block diagram, schematically illustrating the principle for a universal power supply system, according to an embodiment of this invention; and

5 FIG. 2 is a block diagram, schematically illustrating a universal power supply system, according to one preferred embodiment of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One feature of the invention as introduced is a universal power supply (UPS),
10 which can supply an intended power type through a standard interface, according to various different types of electronic products. In other words, one USP is suitable for supplying different voltages to different types of device circuits.

An embodiment is provided in the following for descriptions of the invention.
FIG. 1 is a block diagram, schematically illustrating a principle for a universal power
15 supply system, according to an embodiment of the invention. In FIG. 1, a UPS 90 can supply the intended power type to various types of device circuits 92. The device circuit 92 includes, for example, a personal computer, cellular phone, camcorder, digital camera, portable DVD, portable CD, cassette, MP3 player, personal digital assistance (PDA), or any portable electronic products.

20 As mentioned, the portable electronic products can include various types, and each type of electronic product may have a different power type. The battery used may also be different geometric structure, and therefore cannot be commonly used. This can be very inconvenient. The motivation of the invention, as shown in FIG. 1, introduces the UPS 90, which can supply the intended voltage, according to different electronic

products needs. Even further, the UPS 90 can simultaneously supply intended voltage sources for two or more different products.

FIG. 2 is a block diagram, schematically illustrating a universal power supply system, according to one preferred embodiment of this invention. In FIG. 2, a UPS system includes a UPS unit 100, a standard interface 110, and at least one device circuit 112, 120. Using device circuit 112 as an example, it includes an internal circuit 113, and a battery 114 to supply the needed voltage for the internal circuit 113. In addition, the device circuit 112 also includes a device ID code unit 116 and a power input interface 118. The device ID code unit 116 stores a specific ID code for the device circuit 112, so that the type of the device circuit 112 can be recognized, and thereby the needed power type can be determined. Moreover, the power input interface 118, serves as a power input end to receive power from the battery 114 or from the UPS unit 100.

The UPS 100 includes a voltage supply unit 102, such as a re-chargeable battery with a charger, or a power transforming apparatus that can convert a public AC power source through a socket into a battery-type power source. The power transforming apparatus includes, for example, a regulator, a transformer, and so on. The UPS unit 100 further includes a voltage control unit 104 and a device ID detecting unit 106. The device ID detecting unit 106 can detect and thereby determine the device ID code of the device circuit 112. It even can simultaneously supply the voltages sources to at least two device circuits 112,120.

In order to provide various specific power types, the standard interface 110 between the UPS unit 100 and the device circuit 112 is used and coupled between them. The standard interface 110 can transfer the power source to an intended device without being affected by the type of the device circuit 112. The standard interface 110 can in-

clude, for example, a standard connector 108 to serve as an I/O end, and a multi-wire cable. The UPS unit 100 can obtain the device ID code of the device circuit 112 and supply the needed power type to the device circuit 112 through the standard connector 108, and the multi-wire cable.

5 In order to be suitable for the device type 112, the standard connector 108 needs a standardized size with several plug holes. Each plug hole is respectively connected to one wire of the multi-wire cable. Each of the plug holes is assigned with a function, according to the type of the device circuit 112. The function can be, for example, assigned by the voltage control unit 104. The plug holes include, for example, a
10 power line hole, a grounded line hole, ID detecting line hole, and a safety line hole. The power line hole can provide the needed power. The ID detecting line hole can be used to transmit the ID code signal, the safety hole can be used to transmit a safety signal. The safety signal can include several monitoring signals. For example, a warning signal can be sent when the battery is overheating. The UPS unit should stop if necessary.
15 The safety signal can also include a failure signal when the ID code is not successfully detected. Each wires of the multi-wire cable are connected to the plug holes, respectively.

Since each device type 112 may need a different power type, the number of plug holes being used and their function may be different each time. In this situation,
20 some plug holes may be floating. Moreover, the plug hole may also include some backup holes.

In the invention, a standard interface is provided, so that the battery can supply power to device circuits with different specifications.

According to the principle, the invention also introduces a method to supply a power to a device circuit. The method can include pre-setting the device circuit 112 with a device ID code. Then, the device ID code is detected to recognize the type of the current device circuit 112. The voltage supply unit 102 supplies a power typeac-
5 cording to the device ID code, and sends it to the device circuit 112.

Moreover, a status signal of supplying power is also detected, to know whether the power is being properly supplied.

In conclusion, the invention has introduced a standard interface 110, associated with the voltage control unit 104 and the device ID detecting code 106 of the UPS unit
10 100, and the device ID code unit 116 of the device circuit 112. The UPS unit 100 can be suitable for use in different type of device circuit 112. Further still, the UPS unit 100 can also simultaneously supply power to at least two device circuits 112.

It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the present invention without departing from
15 the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention covers modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.